Changes for the Better

MITSUBISHI ELECTRIC

New Product News

General-Purpose AC Servo
MELSERVO-J2-Super

AC Servo Amplifier with Built-in Program Operation Functions

MR-J2S-CL Type Unveiled!!

The new MR-J2S-CL now offers built in motion programming to compliment the advanced features of the MR-J2S series servo amplifiers.
The MR-J2S-CL enables single axis positioning using a straightforward programming language.
Programmable motion profiles are achieved using the comprehensive instruction set to define target position, speed, acceleration, deceleration and more.
Program flexibility is also possible using external interrupts, latches, and pulse counters as well as looping instructions.
The MR-J2S- CL is ideal for single axis motion application or can be networked to control up to 32 axes. Motor sizes are available with various inertia ratings and ranging from 50W to 7kW.
▪ These functions are supported by the set up software, MRZJW3-SETUP151E (version E1 or later).

For use of this product, refer to the "MR-J2S-CL Servo Amplifier Technical Data Sheets" separately available.

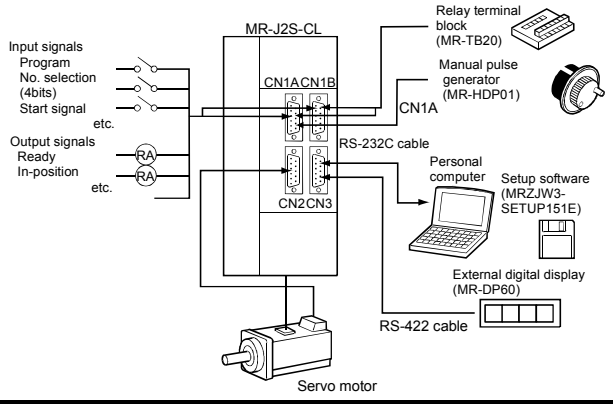
■ Features

- Positioning operation is performed in accordance to the program created by the user.
- Up to 16 programs or 120 steps per axis can be stored.
- Multi-drop operation can be performed for up to 32 axes by serial communication.
- This product has advanced functions such as the high-level real-time auto tuning, machine resonance suppression filter, adaptive vibration damping control, and machine analyzer. Use the setup software (MRZJW3-SETUP151E version E1 or later).
- By simply fitting the battery, you can configure an absolute system (linear axis compatibility).
- The compatible motors are the HC-□S series and HA-LFS series 7.0kW or earlier with high-resolution encoders (131072p/rev).

■ System Configuration

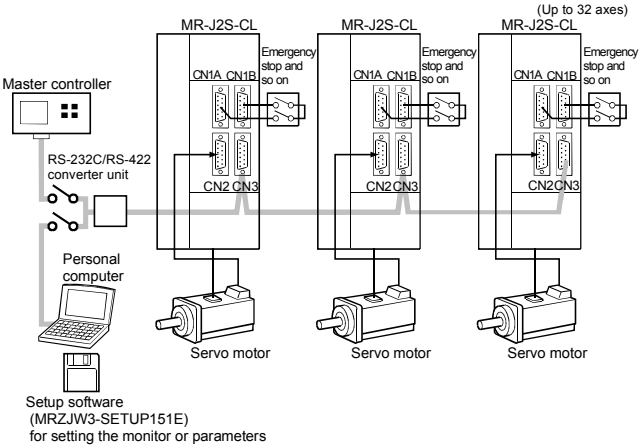
Simple positioning using DI/O

Monitoring, parameter entry and diagnostics can be via PC or parameter unit. Positioning operation is executed using built in digital I/O.



Serial communication operation by RS-422

Connecting servo amplifiers in the multi-drop configuration to perform positioning operation.



Note) The external digital display (MR-DP60) cannot be used for serial communication operation based on RS-422 or RS-232C.

■ Specifications of the Servo Amplifier

Item		Servo Amp.MR-J2S	10CL	20CL	40CL	60CL	70CL	100CL	200CL	350CL	500CL	700CL	10CL1	20CL1	40CL1
Power supply		Voltage/frequency (Note)	Three-phase 200 to 230V/50, 60Hz AC or single-phase 230V/50, 60Hz AC					Three-phase 200 to 230V/50, 60Hz AC					Single-phase 100 to 120V/50, 60Hz AC		
		Allowable voltage fluctuation	Three-phase 170 to 253V/50, 60Hz AC or single-phase 207 to 253V/50, 60Hz AC					Three-phase 170 to 253V/50, 60Hz AC					Single-phase 85 to 127V/50, 60Hz AC		
		Allowable frequency fluctuation	Within ±5%												
Control system			Sine-wave PWM control/current control system												
Dynamic brake			Built-in												
Protective functions			Overcurrent shutoff, regenerative overvoltage shutoff, overload shutoff (electronic thermal protector), servo motor overheat protection, detector alarm protection, regenerative alarm protection, undervoltage, instantaneous power failure protection, overspeed protection, excessive error protection												
Command system	Program	Operation specification	Program language (programmed by the setup software) Program capacity: 120 steps												
		Position command input	Set by the program language One-point feed length setting range: ±1(μm) to ±999.999(mm)												
		Speed command input	A servo motor speed, acceleration and deceleration time constants, and S-pattern acceleration and deceleration time constants are set by the program language. The S-pattern acceleration and deceleration time constants can be set by parameter No. 14 as well.												
		System	Signed absolute value command system (signed incremental value specification method can be used), and signed incremental value command system												
Operation mode	Program operation mode		Depends on the setup of the program language.												
	Manual operation mode	JOG	Inching is performed by contact input or RS-422 (RS-232C) communication based on the speed command set by the parameter.												
		Manual pulse generator	Manual feeding is performed using the manual pulse generator. Command pulse magnifications ×1, ×10, and ×100 are selected by the parameter.												
	Manual home position return mode	Dog type	The Z-phase pulses after passage through the proximity dog are used to make a home position return. A home position address can be set, a home position shift volume can be set, and a home position return direction can be selected. A function for retracting automatically on the dog to return to the home position, and a function for stroke automatic retraction are available.												
		Count type	The detector pulses after a contact with the proximity dog are counted to make a home position return. A home position return direction can be selected, a home position shift volume can be set, and a home position address can be set. A function for retracting automatically on the dog to return to the home position, and a function for stroke automatic retraction are available.												
		Data setting type	A home position return is made without a dog. Any position can be set as a home position by manual operation and so on, and a home position address can be set.												
		Stopper type	The axis is pressed against a stroke end to make a home position return. A home position return direction can be selected, and a home position address can be set.												
		Home position ignored (Servo-on position as home position)	The position where the SON signal was turned ON is defined as a home position. A home position address can be set.												
		Dog type rear end reference	The rear end of the proximity dog is used as a reference point to make a home position return. A home position return direction can be selected, a home position shift volume can be set, and a home position address can be set. A function for retracting automatically on the dog to return to the home position, and a function for stroke automatic retraction are available.												
		Count type front end reference	The front end of the proximity dog is used as a reference point to make a home position return. A home position return direction can be selected, a home position shift volume can be set, and a home position address can be set. A function for retracting automatically on the dog to return to the home position, and a function for stroke automatic retraction are available.												
		Dog cradle type	With the front end of the proximity dog used as a reference point, the first Z-phase pulse is used to make a home position return. A home position return direction can be selected, a home position shift volume can be set, and a home position address can be set. A function for retracting automatically on the dog to return to the home position, and a function for stroke automatic retraction are available.												
Other functions			Absolute position detection, backlash correction, overtravel protection by the external limit switch, software stroke limit, override by external analog control												
Structure			Self-cooling, open (IP00)						Forced cooling, open (IP00)				Self-cooling, open (IP00)		
Environment		Ambient temperature	0 to 55℃ (non-freezing), storage: −20 to 65℃ (non-freezing)												
		Ambient humidity	90%RH or less (non-condensation), storage: 90%RH or less (non-condensation)												
		Atmosphere	Indoors (without exposure to direct sunlight), without corrosive gas, flammable gas, oil mist, and dust and dirt												
		Elevation	Max. 1000m above sea level												
		Vibration	Max. 5.9m/s^2												
Mass (kg)			0.7	0.7	1.1	1.1	1.7	1.7	2.0	2.0	4.9	7.2	0.7	0.7	1.1

Note) The rated output capacity and rated speed of the servo motor used with the servo amplifier assume that the power supply voltage and frequency are as specified in this catalog. They cannot be guaranteed when the power supply voltage is dropped.

■ Program Operation

Position data, speed of the servo motor, acceleration and deceleration time constants and so on are created as programs beforehand.

Positioning operation is performed by selecting the created programs and executing them.

● Command list

Command	Name	Setup	Setup range	Unit	Indirect specification (Note 7)	Description
SPN (Note 1)	Motor speed	SPN (setting)	0 to instantaneous permissible speed	r/min	○	Sets the command speed of the servo motor for positioning. The setting value must not exceed the instantaneous permissible speed of the servo motor used.
STA (Note 2)	Acceleration time constant	STA (setting)	0 to 20000	ms	○	Sets the acceleration time constant to the rated speed.
STB (Note 2)	Deceleration time constant	STB (setting)	0 to 20000	ms	○	Sets the deceleration time constant to the rated speed.
STC (Note 2)	Acceleration and deceleration time constants	STC (setting)	0 to 20000	ms	○	Sets the acceleration and deceleration time constants to the rated speed.
STD (Note 2)	S-pattern acceleration and deceleration time constants	STD (setting)	0 to 100	ms	○	Sets the S-pattern acceleration and deceleration time constants to the rated speed.
MOV	Absolute value move command	MOV (setting)	−999999 to 999999	×10^STM μm	○	Moves the set value as an absolute value.
MOVA	Absolute value continuous move command	MOVA (setting)	−999999 to 999999	×10^STM μm	○	Moves the set value continuously as an absolute value. Be sure to use this command together with the [MOV] command.
MOVI	Incremental value move command	MOVI (setting)	−999999 to 999999	×10^STM μm	○	Moves the set value as an incremental value.
MOVIA	Incremental value continuous move command	MOVIA (setting)	−999999 to 999999	×10^STM μm	○	Moves the set value continuously as an incremental value. Be sure to use this command together with the [MOVI] command.
SYNC (Note 3)	Waiting for external signal to switch on	SYNC (setting)	1 to 3	—	—	Stops the next step until the program input 1 (PI1) to program input 3 (PI3) are turned ON after the synchronous output (SOUT) command is output.
OUTON (Note 3, 4)	External signal ON output	OUTON (setting)	1 to 3	—	—	Turns ON the program output 1 (OUT1) to program output 3 (OUT3). These signals can be turned OFF after a setup time has elapsed, by setting an ON time with parameter No. 74 to 76.
OUTOF (Note 3)	External signal OFF output	OUTOF (setting)	1 to 3	—	—	Turns OFF the program output 1 (OUT1) to program output 3 (OUT3), which were turned ON by the [OUTON] commands.

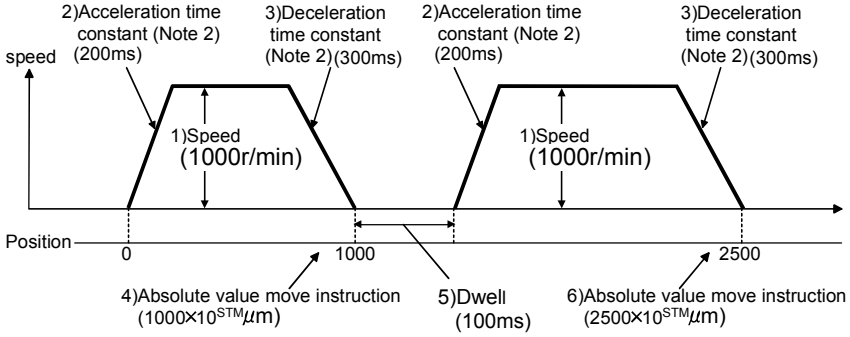
Note: 1. The [SPN] command is enabled when the [MOV], [MOVA], [MOVI], or [MOVIA] command is executed.
2. The [STA], [STB], [STC], and [STD] commands are enabled when the [MOV] or [MOVI] command is executed.
3. The [SYNC], [OUTON], [OUTOF], [TRIP], [TRIPI], [COUNT], [LPOS], and [ITP] commands are enabled even while an instruction is output.
4. If the ON time is set by parameter No. 74 to 76, the next command is executed after the set time has elapsed.
5. If the remaining distance is the setting value or less, the servo motor is not running, or the servo motor is decelerating, the [ITP] command is skipped and control goes to the next step.
6. The unit of STM is magnification to data.
7. General-purpose registers (R1 to R4 and D1 to D4) can be specified to the command setting values.
8. For the content of each command, be sure to confirm "MR-J2S-CL Servo Amplifier Technical Data Sheets."

<Program example 1>

Two types of operation, with which the servo motor speed, acceleration time constant, and deceleration time constant are the same and the move instruction is different, are executed.

Program	Description
SPN(1000)	Servo motor speed 1000(r/min) ..... 1)
STA(200)	Acceleration time constant 200(ms) ..... 2)
STB(300)	Deceleration time constant 300(ms) ..... 3)
MOV(1000)	Absolute value move instruction 1000 (×10^STM μm) ..... 4)
TIM(10)	Dwell 100(ms) ..... 5)
MOV(2500)	Absolute value move instruction 2500 (×10^STM μm) ..... 6)
STOP	Program stop

(Note 1)



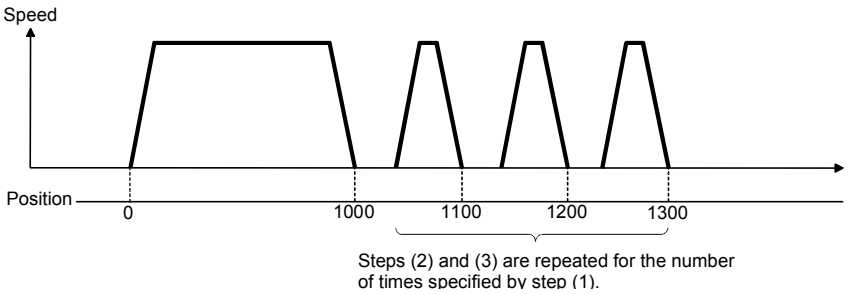
Note: 1. The values set as steps (1), (2), and (3) are enabled as long as they are not set again.
2. The setting value is the time elapsing from the stop of the servo motor to the rated speed.

Command	Name	Setup	Setup range	Unit	Indirect specification (Note 7)	Description
TRIP (Note 3)	Absolute value passage point specification	TRIP (setting)	−999999 to 999999	×10STM μm	—	When the motor passes through the current position, the next step is executed.
TRIPI (Note 3)	Incremental value passage point specification	TRIPI (setting)	−999999 to 999999	×10STM μm	—	While the motor moves by the [MOVI] command or [MOVIA] command, if the motor has moved for the moving distance set by the [TRIPI] command since the [MOVI] command or [MOVIA] command is issued, the next step is executed. Be sure to write the [TRIPI] command after the [MOVI] command or [MOVIA] command.
ITP (Note 3, 5)	Interrupt positioning	ITP (setting)	0 to 999999	×10STM μm	—	When the motor has moved for the distance set beforehand, the motor is stopped by an interrupt signal. Use this command after the [SYNC] command in combination.
COUNT (Note 3, 5)	External pulse count	COUNT (setting)	−999999 to 999999	pulse	—	When the value of the pulse counter exceeds the count value set in the [COUNT] command, the next step is executed. Setting [COUNT(0)] clears the pulse counter to zero.
FOR NEXT	Step repeat command	FOR (setting) NEXT	0, 1 to 10000	times	—	The steps, enclosed with the [FOR (setting value)] command and the [NEXT] command, are repeated for the number of times set beforehand. If zero is set, the steps are repeated unlimitedly.
LPOS (Note 3)	Current position latch	LPOS	—	—	—	The current position is latched by the rising edge of the input device current latch (LPS). The latched current position data can be read by a communication command.
TIM	Dwell	TIM(setting)	1 to 2000	×10ms	○	The next step is waited until the time set beforehand has elapsed.
ZRT	Home position return	ZRT	—	—	—	A manual home position return is executed.
TIMES	Program count instruction	TIMES (setting)	0, 1 to 10000	times	○	Put the [TIMES (setting value)] command on the top of the program to set the number of times of program execution. If zero is set, the program is repeated unlimitedly.
STOP	Program stop	STOP	—	—	—	The program being executed is stopped. Be sure to write this command in the final line.

<Program example 2>

The steps enclosed with the [FOR (setting value)] command and the [NEXT] command are repeated for the number of times set beforehand to execute the operation.

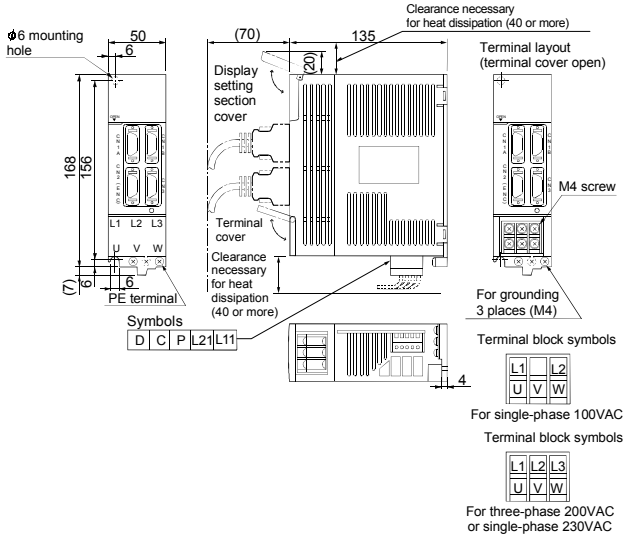
Program	Description
SPN(1000)	Servo motor speed 1000(r/min)
STC(20)	Acceleration and deceleration time constants 20(ms)
MOV(1000)	Absolute value move instruction 1000 (×10STMμm)
TIM(10)	Dwell 100(ms)
FOR(3)	Step repeat command start 3(times)..... 1)
MOVI(100)	Increment value move instruction 100(×10STMμm)..... 2)
TIM(10)	Dwell 100(ms) ..... 3)
NEXT	Step repeat command end
STOP	Program stop



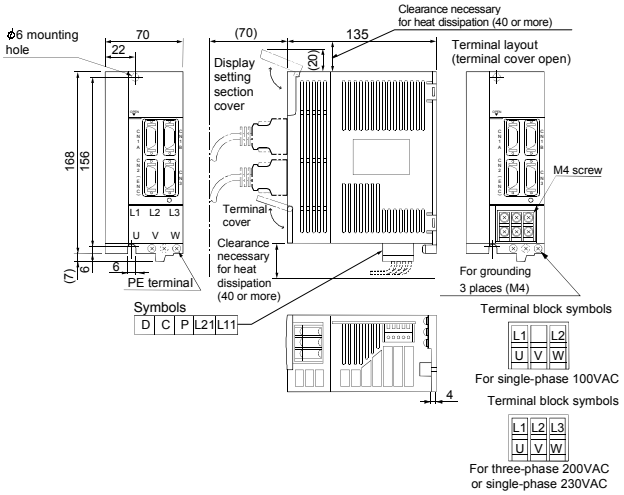
■ Servo Amplifier Outline Drawings

(Dimension unit: mm)

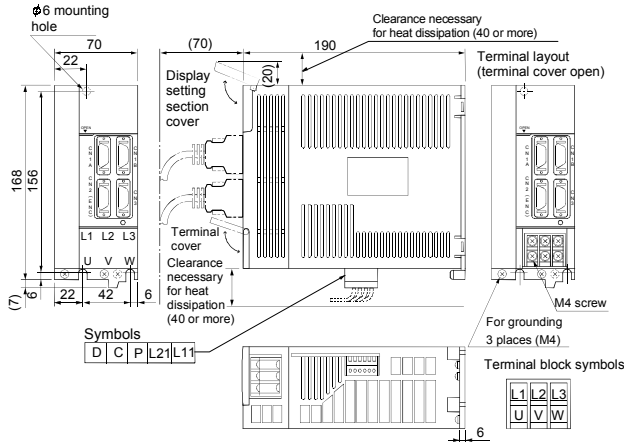
● MR-J2S-10CL, 20CL, 10CL1, 20CL1



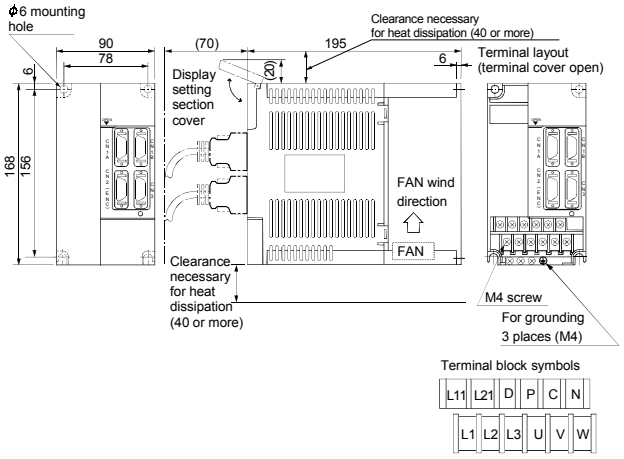
● MR-J2S-40CL, 60CL, 40CL1



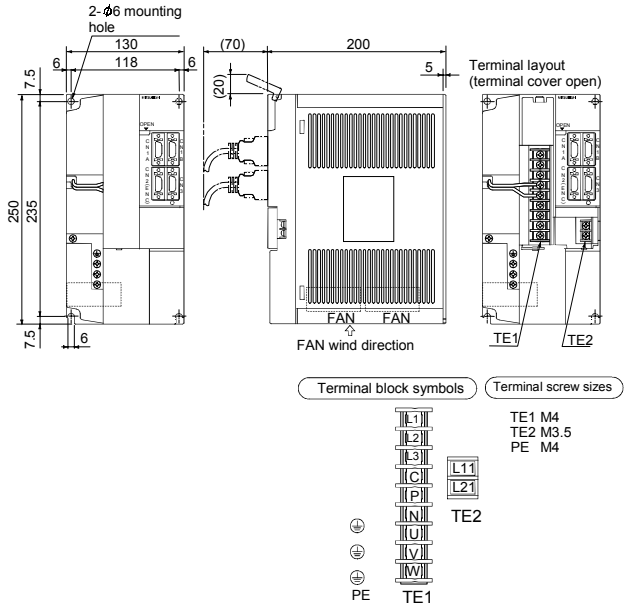
● MR-J2S-70CL, 100CL



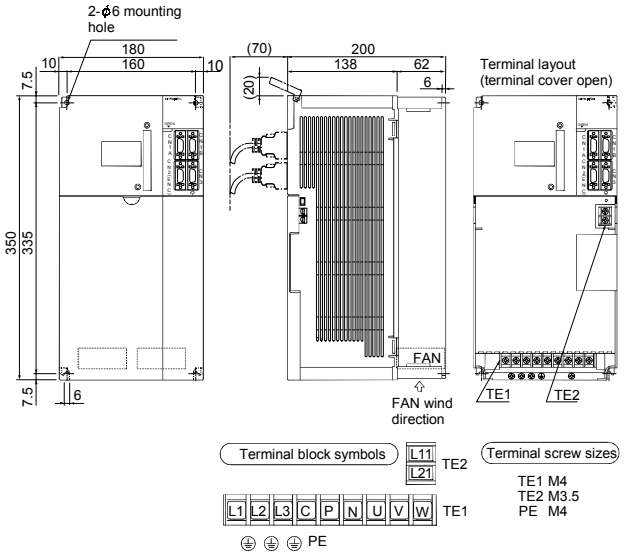
● MR-J2S-200CL, 350CL



● MR-J2S-500CL



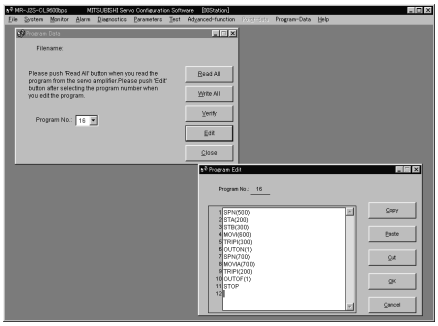
● MR-J2S-700CL



■ MR Configurator <Setup Software>

● MRZJW3-SETUP151E

This software allows you to perform a setup, provide a monitor display, run diagnostics, write and read parameter values, and perform test operation easily using a personal computer.



● Features

(1) Compatibility with Windows 95, Windows 98, Windows Me, Windows NT Workstation 4.0, and Windows 2000 Professional (Note 1) (English version).

(2) A wide variety of monitor functions

The graph display function can show servo motor conditions, such as the instruction pulses, droop pulses, and speeds, with a trigger of an input signal.

Test operation on personal computer

(3) Test operation on personal computer

The servo motor can be test-run easily on a personal computer.

● Operating conditions

(Note 1, 2) Personal computer	IBM PC/AT compatible where the English version of Windows 95, Windows 98, Windows Me, Windows NT Workstation 4.0, or Windows 2000 Professional operates. Processor: Pentium 133MHz or more (Windows 95, Windows 98, Windows NT 4.0, Windows 2000), Pentium 150MHz or more (Windows Me) Memory: 16MB or more (Windows 95), 24MB or more (Windows 98), 32MB or more (Windows Me, Windows NT 4.0, Windows 2000) Free hard disk space : 30MB or more Serial port used.
OS	Windows 95, Windows 98, Windows Me, Windows NT Workstation 4.0, Windows 2000 Professional (English version)
Display	800 × 600 or more display that can show 256 or more colors
Keyboard	Keyboard that can be connected to the above personal computer
Mouse	Mouse that can be connected to the above personal computer. However, a serial mouse is not used.
Printer	Printer that can be connected to the above personal computer.
Communication cable	MR-CPCATCBL3M

● Specifications

The MR-J2S-CL type allows you to use the following functions.

Item	Description
Monitor	Batch display, fast display, and graph display
Alarm	Alarm display, alarm history, and alarm occurrence-time data display
Diagnoses	DI/DO display, function device display, unrotated reason display, cumulative power-on display, software number display, motor information display, tuning data display, ABS data display, and axis name setting
Parameters	Parameter setting, change list display, detail information display, tuning, and device setting
Test operation	JOG operation, positioning operation, motor-less operation, DO forced output, and program test operation
Advanced functions	Machine analyzer, gain search, and machine simulation
Program data	Program data and indirect addressing
File operation	Data read/save, print
Others	Help display

MELSOFT

Note 1. Windows and Windows NT are the registered trademarks of Microsoft Corporation in the U.S.A. and other countries.
2. This software may not operate properly on some personal computers.
3. MR-J2S-□CL(1) operates with MRZJW3-SETUP151E software version E1 or later.

⚠Safety Instructions
To use the products given in this product news to the optimum, always read the "Specifications" and "Technical Data Sheets" carefully before use.